APPLICATION OF CALCIUM CHLORIDE AND ROAD OIL AS DUST PALLIATIVES

By C. C. Newsome, District Engineer, Indiana State Highway Commission, Crawfordsville

The following is a brief description of the methods used in applying calcium chloride on the Lafayette-Crawfordsville road last summer. If convenient to do so, much more effective results can be obtained by applying calcium chloride just after a light shower of rain but not during the rain. If applied during a rain, a part of the material may be washed off the road before it begins to dissolve. It is very noticeable that the dust nuisance is worse during the hours from 9 A. M. to 4 P. M., because, of course, during this period there is not much moisture in the atmosphere to be absorbed.

The first application was made about May 15 at the rate of 1 to 1¼ pounds per square yard, over a width of 16 feet. In a few places, where the traveled roadway was exceptionally wide, the application was made 20 feet wide. The distributor used was of the John Deere type, motor-drawn and 8 feet wide. On 32 miles of the road mentioned above, the cost of preparing the surface (no additional gravel being applied before treatment) and applying the chloride was $30.17 per mile. The total cost, including the cost of the chloride, was $176.14 per mile. This cost is on the basis of about 5 tons of material per mile.

The second application should be applied as soon as the dust begins to appear to such an extent as to be disagreeable to the traveling public. In this case, it was made during the first week in June. This application was at the rate of ½ pound per square yard and cost approximately one-half of the first application.

A third application of ½ pound per square yard was applied about the first week in August. This application should be delayed just as long as possible inasmuch as no more treatments are contemplated during the season. Some dust appeared during the latter part of September, but was not disagreeable to the traffic.

The cost of the three applications, totaling approximately 10 tons per mile, was between $325.00 and $350.00 per mile.

Method of Application

A very small amount of loose material is desirable on the road surface and an excess amount is very objectionable. Calcium chloride works better with a pit-run gravel or, if washed plant material is used, with gravel the maximum size of which is not over ¾ inch. Just before the application, all loose material should be scraped to either side of the road, and then the surface should be dragged thoroughly until smooth. If the surface is rough when the chloride is applied, it will tend to get rougher after the application.

As stated above, a distributor 8 feet wide was used in applying the calcium chloride. This distributor was pulled by a large truck having a hauling capacity of 80 to 100 sacks and was loaded so that two or three men had room to stand inside the back end of the truck and dump the chloride into the distributor. I believe it is desirable to have the same truck and same truck driver pull the distributor at all times. In some instances, however, when one truck was emptied, another truck of the same type which had previously been loaded, was attached to the distributor, thus avoiding the rehandling of the sacks. This latter method requires an additional man with the truck driver to help regulate the speed, and I doubt even then if the spreading can be as uniformly done as in the first method although the latter may be somewhat cheaper. To get the best results, a calcium chloride distributor should be washed out about every two miles to prevent the accumulation of calcium chloride on the spreader board, which tends to give an uneven distribution. The calcium chloride should be applied on one side of the road for a width of 8 feet for a distance of 1 to 2 miles, or far enough to give the first application time to dissolve before traffic is forced to use that side and before the application is made on the opposite side of the road. There is about 2% salt in calcium chloride which has a tendency to rust the under side of automobile fenders if allowed to collect. If traffic is kept off the surface until the chloride thoroughly dissolves and enters the road surface, no appreciable damage will be done to motor vehicles.

Just as soon as the calcium chloride dissolves and penetrates the road surface, it should be dragged with a light drag to prevent pot-holing. This material has the same effect on the road surface as a light rain and everyone knows what effect

rain will have on a gravel surface not properly cared for immediately. A small amount of the loose material may be dragged onto the road surface from time to time as needed to keep the surface smooth, care being taken not to drag in a sufficient amount to cause dust to form. If this dragging is kept up systematically, each day, the road will be kept smooth and the dust will be eliminated.

Gravel Surface Versus Stone Surface

My experience has been that a given amount of calcium chloride applied on a gravel surface will give better results than on a stone surface, although I understand that in some parts of the state good results have been obtained on the latter. Where we had a stone surface, I found that to obtain the best results it was necessary to apply from 2¼ to 2½ lbs. per square yard.

Although, as stated above, there might be a slight damage to motor vehicles due to rust caused by accumulation of calcium chloride on fenders, I have heard very little if any complaint of this. Any complaint is more than offset by the benefits derived and I believe that any motorist would rather take the chance of damaging his car than drive in the dust. I know this to be true with people living on the road treated. I have been told that last summer is the first time in 10 years that people could enjoy their front porches during the heat of the day.

Applying Oil as a Dust Palliative

An experiment in the use and application of several different grades of road oil was carried out on State Road 26. This was a gravel section from Lafayette east to a point about 3 miles east of Rossville, a distance of approximately 17.3 miles. This oil was all applied with a pressure distributor to a width of 18 feet.

The first tank car of oil, applied July 15 just east of Rossville, was a non-asphaltic oil. The surface was scraped free from loose material and the oil was applied on a dry surface at the rate of 0.5 gallon per square yard and at an average air temperature of 75° F. A small amount of loose, local pit-run gravel was scraped back over the oiled surface and dragged. No second coat of oil was applied to this particular

stretch of road which was kept free from dust until about September 15. On July 16, 17, and 18, three tank cars of oil of different grades were applied just east of, and adjoining, Lafayette.

The first tank car of 80% asphaltic oil, specific viscosity Eng. 50° C.-53.3, was applied on a clean bare surface and covered immediately with plant screened gravel which had been previously scraped to one side.

The second tank car of 60% to 70% asphaltic oil, specific viscosity, Eng. 50° C.-34.9, was applied immediately east of that applied from the first car and under similar conditions.

A third tank car of approximately 10% asphaltic oil, with a specific viscosity, Eng. 25° C.-2.1, was applied.

The three tank cars produced a wide variation in grades of experimental oils. The oil from each car was applied at the rate of 0.5 gallon per square yard.

The remaining untreated portion of the road was treated with oil, meeting Indiana State Highway specifications for road oil "A" at the same rate per square yard as above. The specific viscosity of this oil Eng. 50° C. averaged 30 to 36.

Beginning about August 16, a second application of oil was begun at the rate of 0.15 gallon per square yard. The oil used in the second application was practically all non-asphaltic. Before and after this application, the surface was dragged daily and kept in a smooth and dustless condition throughout the entire season, the best results apparently being obtained just east of Lafayette where the 80% heavy asphaltic oil was used as a first coat and the non-asphaltic oil used as a second coat. On that portion of the road where local dipped gravel was used, the application of road oil "A" as first coat and non-asphaltic oil as second coat gave excellent results, and at no time caused any inconvenience to the traveling public, the road being closed for a few hours each day until the fresh oil was covered with gravel.

The total cost of oil applied was approximately $425.00 per mile.